NEWS

comes to Grand Coulee — see p. 5.

no! TONCAN IRON is not prohibitive from an economic viewpoint-

REG U S PAT OFF
TONCAN
COPPER
MO·LYB·DEN·UM
IRON

• Comparative prices of ferrous materials, whether pipe, sheets, plates or some other form, must always be considered, because the material that may theoretically best answer the purpose may be prohibitive from an economic viewpoint.

But Toncan Iron, used where we recommend it, is not prohibitive. Quite the contrary,—it is an investment.

Consider first what Toncan Iron is—an alloy of refined open-hearth iron, copper and molybdenum. Because of its alloy content, it has a higher resistance to corrosion than any other ferrous material in its price class.

Consider the types of service where it has outlasted other ferrous metals — in boiler blow-off lines, on the roofs of railroad cars, in mine cars, in casing for wells supplying sulphur-laden water, in steam lines buried in cinders, in lines aboard ship, in vent stacks of railroad round houses, in railing exposed to salt air and spray.

Consider its longer life in almost every type of service. Its lowering of replacement and maintenance costs is something, too, that should be taken into consideration. Also, the fact that fabrication can often be accomplished in less time, because it is a ductile metal and one that can be cut, bent, formed and welded easily in sheet and plate form and cut and threaded readily in pipe.

All these things enter into the consideration of the most economical ferrous metal for a specific application—and if you keep them in mind, you will agree that the slightly higher price of Toncan Iron not only is not prohibitive, but clearly justified.

May we send you literature?

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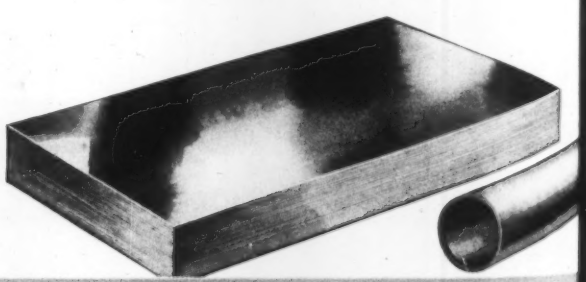

TONCAN IRON

An alloy of refined open-hearth iron, copper and molybdenum
—that grows old slowly

ENGINEERING NEWS-RECORD

NEWS

Volume 123 DECEMBER 14, 1939 Number 24

NOTES ON THE NEWS

Quick Surveys of Construction Events

▶ Abandoning its plan to award contracts for air bases at the Panama Canal and other U. S. possessions by negotiation with large contracting firms, the War Department, within a few days, will call for competitive bids for over $20,000,000 of work. Stabilization of conditions in the construction industry following the flurry of uncertainty that came with the outbreak of war in Europe is given as explanation of the change in plans.

▶ Dean of the civil engineering profession, John F. Stevens, in a brief telegram reproduced in the adjoining column, sends a word of encouragement to the young men of the profession in these trying times.

▶ The Public Roads Administration has issued its annual report. The record of new roads built and roads improved during the year, also of grade crossing elimination, is impressive.

▶ Continuing its active drive against what it believes to be costly practices in the construction industry, the Department of Justice has turned the spotlight on the tile industry in Detroit. How successful it will be in getting convictions as the result of its many indictments remains to be seen.

▶ Active research in many fields of activity having to do with roads was reported at the annual meeting of the Highway Research Board held in Washington last week. The fact that much of this research is rapidly being worked into design and construction planning is indicative of its value.

JOHN F. STEVENS
Discoverer of Marias Pass
December 11, 1889

ON THE 50TH ANNIVERSARY of his discovery of a pass for the Great Northern Ry. through the Rocky Mountains, John F. Stevens, in reply to a telegram of congratulation from the editors of Engineering News-Record says:

"I deeply appreciate your telegram. I have always given every effort of mind and body to make a success instead of a failure, and have tried to let no physical obstacle prevent accomplishment. To young men I would say: Do one thing at a time and do it to the best of your ability. Fifty years is a long time, but I have never regretted, and I am thankful that I was given the opportunity to discover 'Marias Pass.'"

John F. Stevens
Southern Pines, N. C.

Bids Called Soon For Air Bases

War Department abandons plan to let contracts for Panama and other work by negotiation

Although Congress last session authorized the War Department to carry out its construction work in Panama and the other possessions by cost-plus-a-fixed-fee contracts awarded by negotiation, the Secretary of War has decided to do the work under competitive bidding. Bids are being asked this week on an initial program amounting to about $23,000,000, and later work will bring the total to about $35,000,000. (Applications for the non-competitive awards were called in November, *ENR* Nov. 2, p. 29.)

Most of the work will consist of erection of buildings and installation of utilities at Albrook Field, Corundu Military Reservation, Fort Kobbe, How-

(*Continued on p. 6*)

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Marias Pass Discovered Fifty Years Ago

Fifty years ago, Dec. 11, 1889, John F. Stevens, plodding through deep snow at the headwaters of the Marias River in the Rocky Mountains, discovered the pass through which the Great Northern Ry. later built its line to the Pacific Coast. Stevens' own account of it was published in *ENR* May 9, 1935, p. 672.

Previous to the discovery of Marias Pass Stevens had worked on location of the Canadian Pacific across the Great Plains and through the Rocky Mountain and the Gold Range; later he laid the groundwork for digging the Panama Canal. Though now 86 years old, Stevens still takes an active interest in engineering and world affairs.

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Roads Administration Makes Annual Report

Over 17,000 miles of highway improved and 382 grade crossings eliminated during year

More than 17,000 miles of main highway were improved and nearly 3,000 miles of secondary roads were completed during the past fiscal year in the program administrated by the Public Roads Administration, according to its annual report released last week. In addition, 382 railroad-highway grade crossings were eliminated, 86 obsolete grade crossing structures were rebuilt and 438 crossings were protected with signals or other devices.

An outstanding feature of the program was the large amount of work done in widening, straightening, and modernizing important main highways. Most of the work was done in cooperation with the state highway departments, about 13,500 miles—including 9,800 miles on rural portions of the federal-aid system—being completed in this cooperative program.

Classified according to types of construction, the cooperative work consisted of 1,400 miles of graded and drained road; 6,100 miles of treated and untreated sand-clay, gravel, and macadam; 2,600 miles of low-cost bituminous mix and 2,500 miles of portland cement concrete. The bureau also supervised road construction in the national parks, the national forests, and roads financed with funds allotted by the PWA and WPA. Work of this class aggregated 3,700 miles.

Comprehensive study completed

During the year the first comprehensive study ever made of the national highway situation, taking into account conditions on city streets, main rural highways, and on secondary or farm-to-market roads, was completed. The study revealed that express routes passing directly through the centers of our largest cities are needed to relieve traffic congestion. Such work is handicapped by the difficulty of acquiring and the high cost of necessary rights-of-way.

The report recommends completion of a system of inter-regional highways, including connections through and around cities, that the federal-aid highway system be modernized, that the remaining railroad grade crossings be eliminated, and that a Federal Land Authority be created to facilitate the acquirement of lands needed for public purposes. On the study ordered by Congress of the feasibility of constructing and operating on a toll basis three east-west and three north-south superhighways spanning the country, the bureau reported that such a system of toll roads would not be economically feasible, and that it would not solve any considerable part of our highway problems. This report was made public earlier in the year (*ENR*, May 11, p. 655).

Planning surveys progressing

Surveys, to guide the planning of future highway improvements, jointly financed and conducted by the Public Roads Administration and the state highway departments, are progressing rapidly in 46 states and the District of Columbia, according to the report. The surveys include a complete inventory of all rural roads and detailed studies of highway traffic and highway finance. As part of the work a series of large-scale state and county maps is being prepared. The county maps, generally drawn to the scale of 1 inch equals one mile or greater, also show physical features and man-made improvements and will be the first up-to-date and comprehensive series of county maps ever made. The field work of the traffic surveys being carried out is complete in all but nine states. As part of the work, the weights of trucks, commodities carried, and other data were recorded at 3,237 stations for thousands of trucks and truck-trailer combinations. In addition, at the end of the fiscal year, 411 automatic traffic recording machines were in operation for counting and recording the number of vehicles passing hourly.

Federal Work Contractors Must Pay Iowa Sales Tax

Contractors bidding on federal projects in Iowa have been instructed by the state that they will be responsible for sales tax, the orders having been handed down in connection with bids on a contract for the Federal Building in Des Moines.

Instructions have also been issued by the federal government warning bidders that they could not add the sales tax onto their bid price in order to make the government pay the tax.

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First-Year Traffic Heavy On Vancouver Toll Bridge

Over 1,000,000 vehicles and 3,000,000 passengers have crossed the Lion's Gate Bridge at Vancouver, B. C., during the first year of its use. The income has exceeded by $260,000 the operating expenses and interest on the first mortgage bonds.

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Arkansas River Survey Ordered by Schley

Major General Julian L. Schley, chief of the U. S. Engineers, on Dec. 8 ordered that a survey be made of the Arkansas River as to the possibilities of constructing a 9-ft. channel for barge traffic from the mouth of the river to Tulsa, Okla.

McLaughlin Air Service Photo

WILLERT PARK HOUSING PROJECT COMPLETED AT BUFFALO

The Willert Park Housing Project at Buffalo, which provides 173 dwelling units averaging four rooms, has been completed at a cost of $914,000. The development, covering a large plot in the negro slum area, has but 29 per cent of the area taken up by buildings.

Rents are to range from $18 to $21.25 per apartment and the project replaces 62 delapidated structures formerly occupying the site.

The Fleischer Engineering Construction Co., Buffalo, Fred Scheeler, chief engineer, was the general contractor. The Industrial Planning Corp., Buffalo, acted as consulting engineer, and Fred C. Backus, Buffalo, as architect. The Buffalo Housing Authority is owner.

Sam Williams Retires From Contract Bureau

S. M. Williams resigned Dec. 7 as president of the Bureau of Contract Information, Washington, which private agency he was instrumental in founding. Williams has been head of the organization since it was organized on Aug. 22, 1929, with the support of the "conference" surety companies. Desire of the supporting sureties to "have the presidency of the bureau invested in a direct representative of the surety companies" is given as the reason for the change in administration. Carl Laird, vice-president of the Indemnity Insurance Co. of North America, Philadelphia, has been selected as the new president. E. C. Lunt, of the Great American Indemnity Co., New York, will be secretary and treasurer.

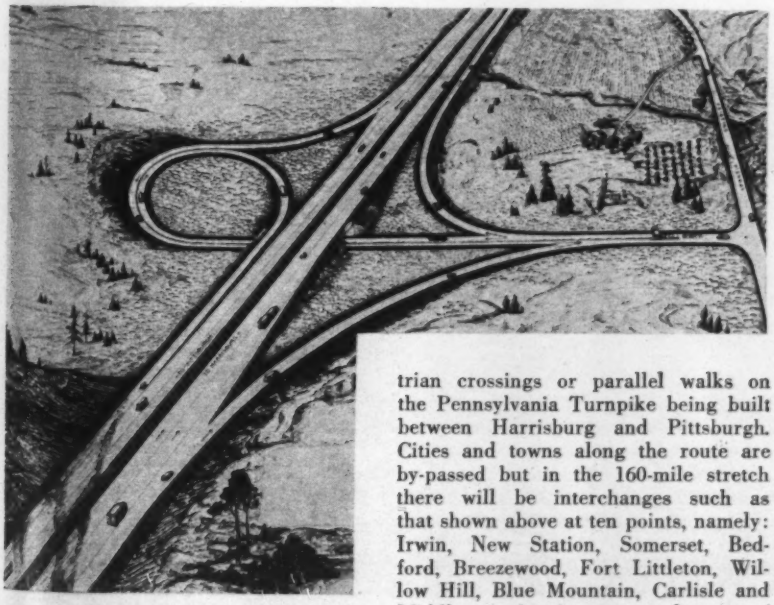
Williams has devoted much of his life to the improvement of responsibility in contracting. He took part in a series of conferences held by contractors, engineers, architects and surety company representatives from 1924 to 1929 at which plans were developed for the establishment of a national clearing house for the construction industry. As a result of these conferences, the Bureau of Contract Information was organized and incorporated as an independent, non-profit, fact-finding institution. The principal function of the organization was to collect information concerning performance records and qualifications of contractors and to make such information available to awarding authorities as a guide in

S. M. Williams

award of contracts to responsible and capable firms.

Williams has been untiring in his efforts to serve contractors, awarding officials and surety interests. These efforts have been largely responsible for the creation of mutual confidence and respect between contractors and sureties in place of the strained relations that existed between the two groups a decade ago.

Typical Interchange for Pennsylvania Turnpike



Grade crossings are eliminated, traffic in opposite directions is separated by a 10-ft. medial strip, traffic lanes are 12 ft. wide and there are no pedestrian crossings or parallel walks on the Pennsylvania Turnpike being built between Harrisburg and Pittsburgh. Cities and towns along the route are by-passed but in the 160-mile stretch there will be interchanges such as that shown above at ten points, namely: Irwin, New Station, Somerset, Bedford, Breezewood, Fort Littleton, Willow Hill, Blue Mountain, Carlisle and Middlesex. An important element of the interchange layout is the long lane provided for acceleration and deceleration when entering or leaving the turnpike.

Texas to Check Contractors' Finances

Highway officials and contractors endorse plans for public accountants to check financial records

Action of the Texas state highway department last week in requiring that contractors seeking to be prequalified to bid on road jobs submit their financial records to a public accountant has been strongly endorsed by the joint committee on qualification and prequalification of the Associated General Contractors and the American Association of State Highway Officials. The committee has urged all state highway departments to take similar action.

The Texas regulations establish financial requirements which agree closely, except that credit is allowed for equipment owned, with the standard prequalification form proposed by the joint committee. This form, drawn up in an effort to standardize the various forms of prequalification now in use in thirty states, was discussed in October by the A.G.C. governing board and by the convention of the A.A.S.H.O.

Reciprocity basis

It is hoped by these bodies that the standard will be generally adopted by the states on a reciprocity basis, thus greatly simplifying the accounting and legal problems of contractors operating in several states.

Method of adoption of the proposed standard would vary in different states. Some highway departments administer prequalification under laws giving them wide discretion or without any explicit legislative authority; in these the highway commissioner could simply adopt the new standard. Other states have detailed laws which would have to be amended by the legislatures.

Another element in the situation is the Public Roads Administration. This agency has long favored the principle of prequalification and uniformity in its application. Through its authority over the form of federal-aid highway construction contracts, PRA would have the power to enforce a particular form of prequalification; it is not unlikely that, if adoption of the proposed standard is too long delayed, PRA might avail itself of this power.

Proposed standard

The proposed standard follows the practice common in most states of basing the size of job a contractor may handle on the amount of his net quick assets (liquid assets less current liabilities). Permitted forms of liquid

(Continued on p. 6)

Tower Moved Without Dismantling

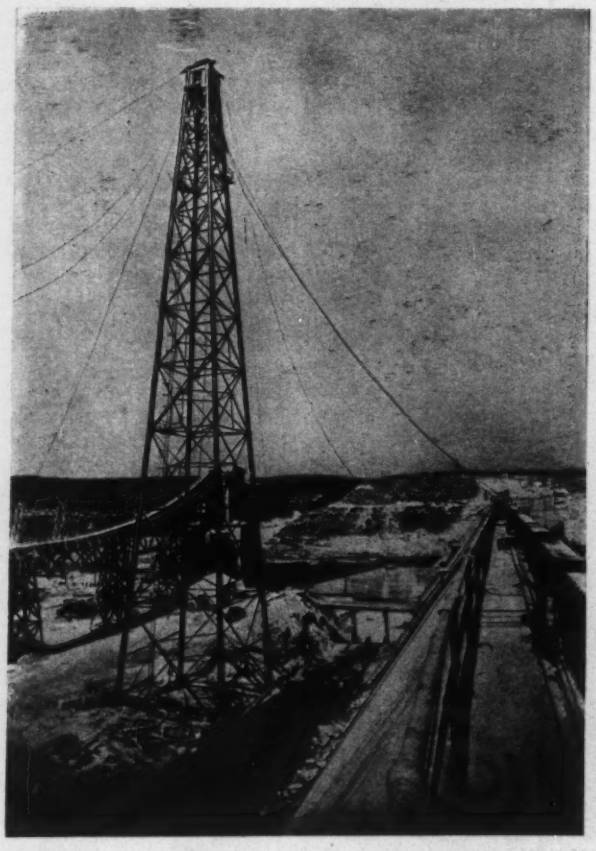
Photo by Elwood M. Payne

INCH A MINUTE. That is the rate at which two of these jacking rigs pulled a 70-ton 180-ft. tower from the downstream to the upstream side of Marshall Ford Dam. The wheel and gear arrangement was especially designed for the job to substitute for the customary ratchet and jacking bar on 50-ton jacks. The pin connection takes a fresh "bite" every 15 in. in a punched steel bar connecting with the tower legs.

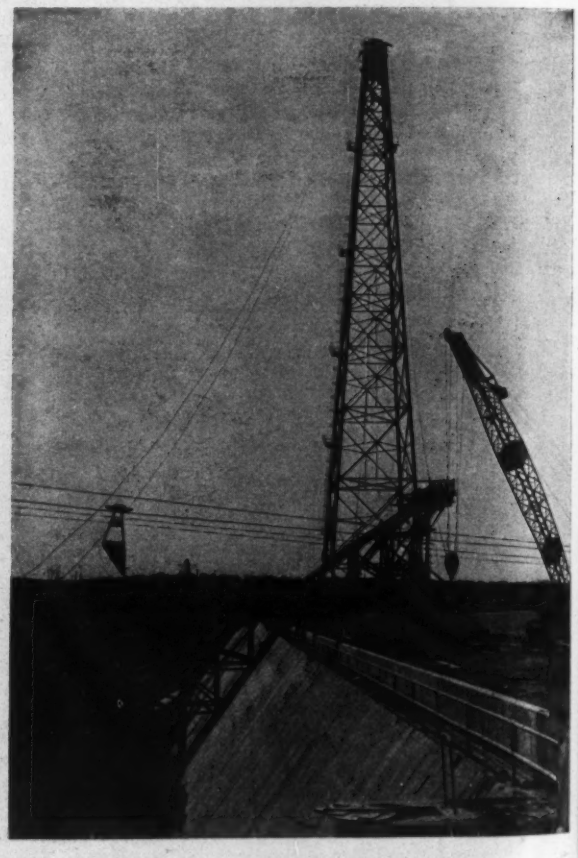
A SHORT-CUT in preparation for construction of the 70-ft. top extension on Marshall Ford Dam on the Colorado River near Austin, Texas, was accomplished by moving the 70-ton 180-ft. steel cableway tail tower on an inclined track 132 ft. horizontally and 80 ft. vertically to its new position on the upstream side of the dam. The operation took place in 32 working hours. Motive power was provided by two 50-ton hand-operated jacks, and a winch was used as a stabilizer.

For the move, an inclined trestle supporting two rails was built with its lower end at the downstream pair of legs. A section of each upstream leg was removed to accommodate the slope so that the tower could retain its vertical position during transit; then the tower was brought to bear on roller skids on the trestle. At the upper end of the trestle were fixed two 50-ton jacks adapted especially for the work. In place of the customary ratchet and jacking bar, each jack had a shop-made hand-wheel shown in the illustration at the left. Connection to the two sets of tower legs was made with two heavy steel ribbons punched for pin connection to the jack at 15-in. intervals. Six men working each wheel moved the tower at a rate of about an inch per minute. The stabilizing cable winch, mounted on a truck at the bottom of the incline, operated through a sheave at the top of the trestle.

Ross White, superintendent of construction for the contractors, McKenzie Construction Co. and Brown and Root, designed the jacking rig. It is a U. S. Bureau of Reclamation job.

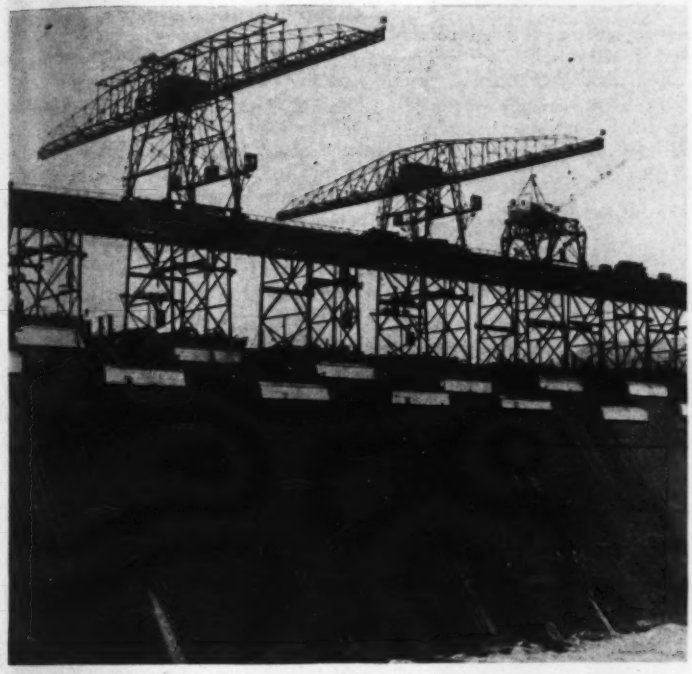


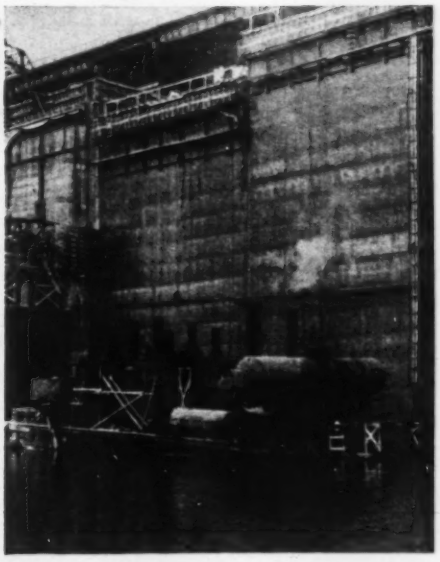
READY FOR THE JOB. Cableways for carrying concrete had been slacked away when this picture was taken, but the inclined trestle to the upstream side had not yet been built.



NEW POSITION. When the tower finally arrived at the end of its 154-ft. journey its new footings and lower leg sections were ready to receive it. Note platform on which jack rigs were mounted.

Steam Heat Aids Concreting As Winter Comes to Coulee





"IRON DUKE", floating heating plant moored at the upstream face of Grand Coulee Dam. Total output of the cluster of boilers is about 1,000 hp.

STEAM HEATED SHELTERS of canvas and wood frame (left) cover the freshly placed concrete in Grand Coulee Dam.

AS THE TEMPERATURE at Grand Coulee begins its annual dive toward the minus marks, engineers are using artificial heat to postpone the day for shutting down concreting operations. Steam heat is supplied to all parts of the job from a floating boiler barge, the "Iron Duke."

The several steam boilers, which have a total capacity of about 1,000 hp, burn fuel oil brought to the site in tank trucks and delivered by a fuel barge to a tank on the "Iron Duke."

Steam hoses from the boilers connect to an insulated steam piping system, which delivers the heat inside of temporary tarpaulin shelters erected over newly poured concrete.

In mass concrete the contractor is permitted to use 1 per cent of $CaCl_2$ (furnished by the government), provided water and aggregate are heated, canvas enclosures are used and a layer of sand is placed on top of the blocks following completion of the pour.

When the air temperature is below 32 deg. F., if special thermometers record temperatures of 50 deg. F. or lower in blocks less than 72 hr. old (or 48 hr. where $CaCl_2$ has been used), concrete placing operations must stop.

Grand Coulee Dam is being built by Consolidated Builders, Inc., under supervision of the U. S. Bureau of Reclamation.

Bureau of Reclamation Photos

OIL FOR WINTER WORK AT COULEE. Large tank trucks bring fuel oil to the dam—oil which is transformed into heat to protect concrete from the sapping effects of freezing.

Consulting Engineers Study Efficiency Legislation

Legislation to promote more efficiency in public works construction was discussed at a meeting of the Institute of Consulting Engineers held in New York, Dec. 6. Senator Thomas C. Desmond, an engineer member of the New York State legislature, spoke in detail of the "Public Projects Efficiency Bill" that he will reintroduce into the New York State legislature in January but broadened his remarks to include the application of the same principles to other states and to federal works.

The bill which Senator Desmond will place before the New York State legislature authorizes any state or local public body to call in independent consultants to pass upon the economy, feasibility and efficiency of public works projects and to estimate the public benefits therefrom. It gives to these bodies the power to have a check made upon the designs of their own engineers or of consultants if question arise as to the economy or desirability of the project.

In discussion it was brought out that the legislation will need active support if it is to be passed as it is opposed by Civil Service groups. Dugald C. Jackson, president of the Institute, urged the members to study the legislation and give it their support.

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Bids for Air Bases

(*Continued from p.* 1)

ard Field, Fort Sherman, and Mount Hope Military Reservation.

A controlling factor in the decision in favor of competition was the War Department's belief that "conditions in the building industry both in the United States and the Canal Zone are reasonably stable and wide fluctuations in the material and labor market are not probable." This being the case, it was felt that advantages of competition outweighed the greater speed of negotiated contracts.

The normal 60-day advertising period is being reduced in this case to 45 days because the plans are so far advanced that it is considered unnecessary for bidders to visit the job site. Moreover, most of the foundation work and site preparation has already been done by the Constructing Quartermaster.

Early action is expected to get work started on several large army air-base projects outside the United States. These include a $3,600,000 project in Alaska, a $9,334,800 job in Hawaii, and a $9,182,000 air base at Puerto Rico. It has not yet been decided whether these will be awarded competitively or by negotiation, but it is assumed that the same factors which guided the Panama decision will be operative as regards these projects.

• • •

Qualifying Contractors

(*Continued from p.* 3)

assets include cash and listed securities; 90-day receivables; bid deposits, unpaid estimates, and retained percentages on jobs on schedule; materials at site of going contracts; surrender value of life insurance, and letters of credit.

Determining responsibility

The old problem of the value to be allowed for equipment owned is solved by allowing no direct credit for this item but accepting a bank's estimate of its loan value as evidenced by letters of credit. Reasoning behind this is that no one ever went broke through having too much cash, but a man with lots of equipment and little capital is in a weak position.

Second item in determining responsibility is experience. The standard provides that a contractor with two or more years' experience may take jobs amounting to five times his net quick assets. The factor is increased to eight times for contractors with especially favorable experience. This last is determined by having the contractor rated by highway departments of states in which he has done work. Rating would be based 60 per cent on quality and speed of work, and on prompt payment of claims and attitude toward the department, the public, and labor.

Members of the committee are: Richard Hopkins, Albany, N. Y., chairman; H. K. Bishop, chief of construction division, Public Roads Administration, Washington, D. C.; W. W. Mack, chief engineer, Delaware State Highway Commission; Julian Montgomery, Texas State Highway Department; E. L. Roetigger, Wisconsin State Highway Department; M. W. Watson, chairman of the Highway Contractors' Division, A.G.C.; H. B. Zachry, vice-president, A.G.C.; and Harry J. Kirk, Division Manager, Highway Contractors' Division, A.G.C.

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Bids to Be Opened Jan. 4 For Jacksonville Housing

Bids on a $1,000,000 addition to the Brentwood housing project in Jacksonville, Fla., will be opened Jan. 4. About 300 units will be constructed to supplement the present project of 230 units.

The Jacksonville authority also plans a $2,000,000 expenditure during 1940 on a Negro housing colony in Hansontown. Bids have not yet been invited on this project.

Building Inquiry Begun at Detroit

Wholesale indictments by federal grand jury; conspiracy charged in tile industry

A grand jury indictment, naming 35 individuals, eight national manufacturing concerns, three contractors' associations and two local AFL unions, has been returned in the federal court at Detroit, Mich., by the special federal grand jury investigating the tile industry in that city. The intent of the conspiracy, it is charged, was to drive 60 independent tile contractors in the Detroit area out of business by shutting off their supply of tile and labor to place the tile.

Action has centered around two charges: namely, (1) that the defendants violated the restraint of trade section of the Sherman Act—it being charged that a conspiracy has existed since 1936 to prevent tile being shipped to any contractor in the Detroit district other than contractors belonging to the three associations named by the defendants, (2) that manufacturers, contractors and the unions, conspired to give members of the Contractors Association a monopoly on purchases of tile in the area.

The three associations named are: Detroit Power Contractors Association; The Greater Detroit Tile Contractors Association and The Tile Contractors Association of America. Local 32 and Local 40 are the defendant labor unions. Defendant corporations named are: Wheeling Tile Co., Wheeling, W. Va., Mosaic Tile Co., Zanesville, Ohio, American-Franklin-Olean Tiles, Inc., Lansdale, Pa., United States Quarry Tile Co., Parkersburg, W. Va., and East Sparta, Ohio, National Tile Co., Anderson, Ind., Robertson Art Tile Co., Morrisville, Pa., Standard Tile Co., Zanesville, Ohio, and Sparta Ceramic Co., East Sparta, Ohio.

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Idaho 1940 Highway Fund Totals $6,400,000

About $6,400,000 will be available for highway work in Idaho during 1940, according to J. H. Clabby, Idaho department of public works. It is estimated that $3,000,000 will be used for construction, $1,750,000 for maintenance, $1,000,000 of the motor fuels tax will be diverted to local units, $200,000 for WPA sponsorship, $185,000 for preliminary surveys and $168,000 for administration. Federal funds are expected to total $1,900,000, and the motor fuel tax $4,300,000.

WASHINGTON HIGHLIGHTS

Special reports by Paul Wooton

IT DOESN'T SHOW in the statistics yet, but indications are that there will be a pick-up around the first of the year in FHA-insured multiple-housing rental projects. These have been almost at a standstill since FHA's rental housing division decided last spring to restrict itself to projects renting at twelve dollars a room or less. In the interval, the division has established a regional set-up through which it has been propagandizing actively among builders. Reports from regional offices on preliminary loan negotiations are now most encouraging, and a substantial volume of applications, at very low rentals, is expected soon. In one large eastern city, preliminaries are almost complete on a project to rent at $6 per room.

CHAIRMAN RAY MCNAUGHTON of the Grand River Dam Authority has been recommended by the Authority as general manager of the $20,000,000 PWA project succeeding R. V. L. Wright, who resigned two weeks ago. McNaughton, a Miami, Okla., banker, has been chairman of the state agency constructing the project during most of the construction period. Under terms of the PWA's contract with the GRDA, the name of Wright's successor must be approved by PWA. The position pays $15,000 a year.

STATEMENTS in the daily press that tourists are not being permitted to approach Boulder Dam because of fear of sabotage are entirely incorrect. As in the past, tourists are being encouraged to go to Boulder dam. Because the average size of inspection parties has increased from 30 persons to 60, the number of guides accompanying each party has been increased to two.

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Arizona Highway Officials Not Opposed to Unions

The Arizona State Highway Department has not threatened to discharge engineers who join a union, according to W. R. Hutchins, state highway engineer. Referring to the report published in these pages (*ENR* Nov. 16, p. 559) to the effect that thirty engineers who had joined the Technical Engineers', Architects' and Draftsman's Union had subsequently resigned from the union because they had been threatened with dismissal, Hutchins said: "No orders were issued by anyone in authority to the effect that anyone joining a union would be discharged. There is no distinction made between a union employee and a non-union employee by officials of the Arizona State Highway Department."

Commenting on Hutchins' statement, representatives of the union state that it is probable that no formal orders were issued but cite the fact that the highway engineers all resigned from the union as indicating that pressure of some sort was brought to bear on them to end their union activities.

Newark Evening News Photo

CENTURY-OLD NEW JERSEY BRIDGE FAILS UNDER TRUCK

THIS CENTURY-OLD span over the Pequannock River on the highway between Riverdale and Pompton Lakes in New Jersey collapsed recently under the weight of a 15-ton trailer truck loaded with coal. The two-lane structure, known as the "Old Slingerland Bridge" was about 50 ft. long.

Reservoir Depletion Worries New York

Drought conditions lead to conservation efforts and resort to underground supplies

Continued depletion of New York City's reservoirs is causing concern that a water shortage may develop before thawing snow and spring rains replenish the upstate storage basins. The margin of about 140 days' supply (based on present needs of one billion gallons a day) is considered small according to Joseph Goodman, Commissioner of Water Supply, Gas and Electricity.

Conservation efforts, including the abandonment of street sprinkling and special attention to leak detection, have been introduced. Patrick Quilty, chief engineer of the department, reports that increased quantities of water are being pumped from underground sources on Long Island. This is being done to conserve reservoir supplies during the drought period.

Ashokan Reservoir, one of the principal storage basins in the Catskill Mountains, is so low that the inundated village of Gilboa has emerged. This has been submerged since 1925.

Additional water supply facilities for the city are now under construction (*ENR*, Mar. 31, 1934, p. 698; Jan. 14, 1937, p. 41 and Aug. 17, 1939, p. 233), but the first stage of this project is not scheduled for completion until 1944.

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Water Shortage Exists In Southern Ontario

Southern Ontario is experiencing a water shortage which has become serious in some districts. November rainfall has been greatly below normal and at Peterborough the Otonabee River is so low that insufficient water is available for the local power plants, power having to be purchased. In Leeds County many wells and cisterns are dry and if no rain falls before the impending freeze-up, the water supply situation will become serious.

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Texas Truck Law Upheld By State Supreme Court

The Texas state supreme court on Dec. 6 upheld the right of Texas highway patrolmen to halt trucks they believe to be overloaded and to require any excess of the 7,000 lb. limit to be unloaded. The ruling upholds a decision of the Dallas court of civil appeals.

"Holing Through" ceremonies are taking place in many parts of the country, these days, and Toledo, Ohio, isn't missing its share of the festivities. **George N. Schoonmaker,** Toledo City Manager, is shown pulling the switch to set off the blast which opened up the Maumee River tunnel, a part of the city's $9,400,000 Lake Erie water supply project. Watching (left to right) are: **Jas. H. Lynch,** division engineer in charge for Greeley and Hansen; **Ernest Kitchen,** PWA engineer; **R. C. Stark,** mayor; and (extreme right) **Joseph Kalill,** contractor on the tunnel job. The tunnel, considered the most hazardous element of the project, is a 72-in. tube 110 ft. below the Maumee River water surface. It is 2,900 ft. long and cost $280,000. Almost half of the units in the entire project are now underway.

Russell G. Cone, engineer for the Golden Gate Bridge and Highway District, has a long record on bridge construction but this is the first time he has remained on a job some two years after finishing it. The "Gate Bridge", built under his supervision as construction engineer, has continued to require engineering talent in its operation and maintenance. That's really the bridge outside the window.

MEN AT WORK

On the earth and rock fill dam being built as part of the $3,500,000 water supply improvement for the City of Bethlehem, Pa., **J. S. Richards** is chief engineer for the city. Under his supervision work is advancing rapidly on the dam, which will be 140 ft. high with a crest length of 1300 ft. Richards, a self-made engineer, takes pride in his ability to get along with the contractor—in this case C. W. Good of Lancaster.

Since **Ross White** was graduated from Iowa State College in 1910, he's followed heavy construction work all over the map. Among other places, his hat has hung in the Philippines, California, Quebec and Tennessee. At present he is superintendent for the contractors on Marshall Ford Dam on the Colorado River near Austin, Texas. Some of his work there is described on p. 4.

J. Q. Barlow, consulting engineer and chief engineer of the Utah Construction Company, is still busily at work after "active practice" for more than 57 years. He has an enviable background of experience that includes dams, tunnels, terminals, irrigation systems, and more than 600 miles of railroad. His present work ranges from New York's Delaware Aqueduct to Grand Coulee Dam.

MEN AND JOBS

CHARLES E. CAREY, principal construction engineer and formerly acting administrator of the Bonneville project, has been named consulting engineer in a shift of the engineering personnel by Administrator Paul J. Raver. S. E. SCHULTZ, engaged by the Bonneville authorities on a consulting basis, has been named acting chief engineer in charge of general engineering plans. Other members of the engineering staff affected by the change and their new ratings are: BEN W. CREIM, principal engineer, construction section; DON CAMPBELL, senior transmission engineer, design section; R. F. STEVENS, senior substation engineer, design section; DEAN WRIGHT, supervisor of drafting, design section; H. R. STEVENS, senior inspection engineer and acting chief of the materials and inspection section; T. C. SMITH, acting chief of distribution engineering section, and C. C. Long, principal engineer, operating section.

GEORGE F. NICHOLSON, consulting engineer, has been appointed consultant for the Port of Long Beach, Calif. Nicholson, who has had 30 years' experience in the harbor field, built the modern facilities for the ports of Seattle and Los Angeles. He has also acted as consultant for a number of other ports in the United States, Mexico and Europe.

M. DAVIS, chief engineer of the aviation branch, department of transport, Ottawa, Ont., is directing the construction of a large airport at Great Village, N. S., and one for Colchester County, N. S.

PHILIP P. SMITH, federal engineer of Sheridan, Wyo., is making a flood control survey of the Yellowstone River basin near Billings, Mont.

W. F. CAMPBELL has been appointed acting engineer of Haldinand County, Ont., to succeed A. L. S. NASH, who has been appointed officer in command of the 54th Field Battery, Royal Canadian Artillery.

ARTHUR B. MORRILL, engineer in charge of the civil and sanitary engineering design for Detroit's new $23,000,000 sewage treatment plant, has been named engineer of sewage treatment at Detroit and will be in charge of operation of the new plant. Morrill is a sanitary engineering graduate of MIT and taught three years in a Chinese government engineering school at Tientsin. LEO V. GARRITY, now in charge of all construction on the project, has been named associate civil engineer of sewage treatment and will be Morrill's assistant. Garrity graduated from the University of Wisconsin in 1923, spent the following four years on construction of the Milwaukee sewage treatment plant, and went to Detroit in 1927 to spend the next five years supervising construction of an addition to Detroit's water supply system.

HAROLD A. THOMPSON, Drexel Hill, Pa., has been named a member of the engineering staff of the Water and Power Resources Board, Pennsylvania State Department of Forests and Waters.

CHARLES E. KREUGER, engineer for the National Park Service, has been transferred from Henryetta, Okla., to the National Park office at Phoenix, Ariz., where he will engage in the preparation of engineering plans for Arizona parks and allied areas.

CHARLES P. CASEY, assistant director of the Illinois department of public works and buildings, will supervise administration of the Illinois truck act. A new branch, known as the division of motor carriers, has been formed with F. W. Lewis, Robinson, Ill., as superintendent, to aid in the work. LOUIS RECHNER, Springfield, has been transferred from the division of highways to be chief of the bureau of safety of the new division.

STANLEY L. BAKER, city engineer of Newton, Iowa, has resigned to join the engineering staff of the Iowa Conservation Commission, Des Moines.

J. CARROL RODGER and W. K. MCMILLAN, engineers with the Interoceanic Communications Co., Sacramento, Calif., are supervising their company's work in constructing two highways in Chiapas State, Mexico.

FRANCIS R. MACLEAY, consulting engineer formerly associated with George E. Strehan, New York City, plans to continue general engineering practice in New York City. He will specialize in buildings, economic planning, operation of industrial plants and processes and equipment.

G. DOUGLAS ANDREWS, formerly state director of the Pennsylvania regional office of the Public Works Administration, has organized a general construction firm under the name of Andrews & Andrews, Inc., 400 Madison Ave., New York, with himself as president and engineer for the firm.

E. N. TORBERT, formerly of the Tennessee Valley Authority, has been appointed field coordinator for a consolidated survey of the 1,200,000-acre Columbia basin reclamation development.

E. A. BROWN, authority on structural utilization of wood, and civil engineering graduate of the University of Nevada, has been appointed Washington representative of the California Redwood Association.

EARL BAUGHMAN, division engineer in charge of the Jackson, Tenn., office, Tennessee Valley Authority, has been transferred to the district office at Tupelo, Miss. His transfer follows the return of EARL WALL, former division engineer to the Jackson office after a severe illness.

JAMES M. GLYNN, formerly city engineer of Reno, Nev., and at present with the WPA, has returned to Reno as city engineer to succeed CHARLES HILL. Hill resigned last summer after four years as city engineer, and EDWARD FRISCH, assistant city engineer, has been acting city engineer.

JOHN AMES, city manager of Ames, Iowa, has been elected vice-president of the International City Managers Association. Ames some years ago was employed as bridge engineer with the Iowa State Highway Commission.

JOHN O. HALL, formerly city manager of Nowata, Okla., has been appointed city manager and engineer of El Reno, Okla., to succeed GEORGE M. MARCH, who resigned.

PHIL W. SMITH has been appointed city engineer for St. Peter, Minn.

MEETINGS

AMERICAN SHORE AND BEACH PRESERVATION ASSOCIATION, annual meeting, Hotel Carlton, Washington, D. C., Jan. 10.

NATIONAL AIR CONDITIONING ASSOCIATION, first annual convention, Hotel Stevens, Chicago, Ill., Jan. 15-17.

CANADIAN CONSTRUCTION ASSOCIATION, Royal York Hotel, Toronto, Ont., Jan. 16-17.

AMERICAN SOCIETY OF CIVIL ENGINEERS, annual meeting, New York City, Jan. 17-19.

AMERICAN SOCIETY OF PLANNING

(*Meetings continued on p.* 10)

Meetings

(Continued from p. 9)

OFFICIALS, Chicago, Ill., January 18-19.

NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS, Cincinnati, Ohio, Jan. 25-27.

NATIONAL PUBLIC HOUSING CONFERENCE, Washington, D. C., Jan. 26-28.

AMERICAN ROAD BUILDERS ASSOCIATION, Chicago, Jan. 29-Feb. 2.

NATIONAL PAVING BRICK ASSOCIATION, annual meeting, Congress Hotel, Chicago, Ill., Jan. 30-31.

REGIONAL AND LOCAL

AMERICAN WATER WORKS ASSOCIATION, New York Section, winter meeting, Commodore Hotel, New York City, Dec. 28.

ASSOCIATED AMERICAN GENERAL CONTRACTORS, Central Branch, annual convention, Des Moines, Iowa, Jan. 10-11.

KANSAS CONTRACTORS ASSOCIATION, Kansas City, Mo., Jan. 11-12.

LOUISIANA ENGINEERING SOCIETY, fifth annual meeting, St. Charles Hotel, New Orleans, Jan. 12-13.

ENGINEERING CONGRESS, University of Colorado, Boulder, Colo., Jan. 18-19.

ANNUAL ENGINEERS INSTITUTE, North Carolina State College, Raleigh, N. C., Jan. 24-27.

ILLINOIS SOCIETY OF ENGINEERS, Rockford, Ill., Jan. 25-27.

NORTH CAROLINA SOCIETY OF ENGINEERS, annual meeting, Raleigh, Jan. 26.

AMERICAN SOCIETY OF CIVIL ENGINEERS, North Carolina Section, Raleigh, Jan. 27.

ELECTIONS AND MEETINGS

T. C. KIRKMAN, High Point, N. C., has been elected president of the Duke University Engineering Alumni Association to succeed George Johnson. Other officers are: C. H. Nickerson, Torrington, Conn., vice-president; J. S. Burch, Raleigh, secretary.

THE NORTHERN CALIFORNIA Counties Highway Conference will be held annually to enable county officials of 27 northern California counties to get together.

ERNEST REDPATH was elected president of the Association of Professional Engineers of British Columbia at the association's 20th annual meeting held recently in Vancouver. F. W. MacNeill was elected vice-president. Councillors are: H. C. Anderson, T. H. Crosby, P. B. Freeland, R. A. McLachlan, and C. E. Webb.

R. M. LOBDELL, Waukegan, was elected head of the Illinois Association of County Highway Superintendents at the organization's recent annual meeting in Springfield. Other new officers are: Walter C. Dye, Danville, vice-president, and Harold Tyson, Kankakee, secretary-treasurer.

NEW OFFICERS elected recently at the 21st annual meeting of the Iowa section, Am. Soc. C. E. are: R. B. Kittredge, professor of transportation, University of Iowa, president; Mark Morris, traffic engineer with the Iowa State Highway Commission, vice-president; L. O. Stewart, head of civil engineering department, Iowa State College, secretary, and Ed Thorsen, structural engineer with the Portland Cement Association, Des Moines, Maurice Miller, Hawkeye Portland Cement Co., and A. H. Wieters, engineering director of the Iowa State Board of Health, directors. T. R. Agg, director of the parent society and dean of the engineering division Iowa State College, and James L. Ferebee, vice-president of the national society and chief engineer of the Milwaukee sewerage commission, were chief speakers.

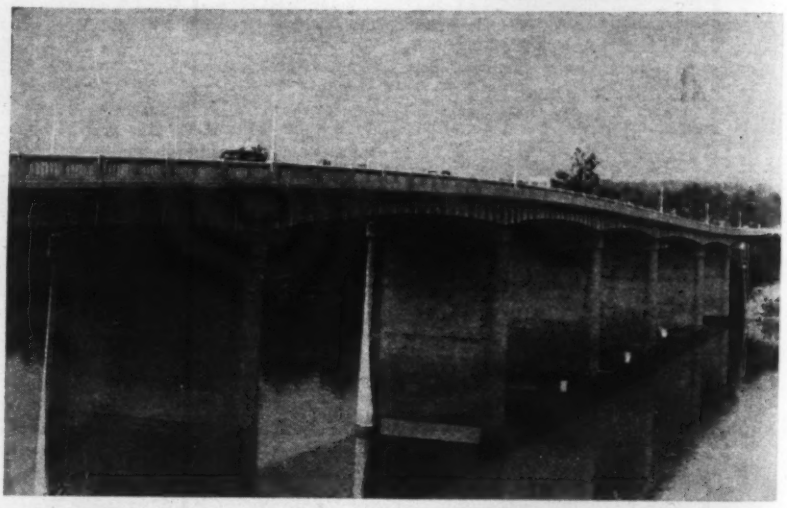
WILLIS H. CARRIER, Carrier Corp., in speaking to the Birmingham, Ala., Engineers Club last week, told of air conditioning and its increasing scope.

RECENTLY the engineers of North Central Iowa organized at Mason City with Elmer Ward being elected chairman and L. L. Lawton secretary.

Examinations

U. S. GOVERNMENT: principal draftsman, $2,300; senior draftsman, $2,000 annually; engineering draftsman, $1,800; assistant draftsman, $1,620; junior engineering draftsman, $1,440. Applications to be on file by Jan. 2 with U. S. Civil Service Commission, Washington, D. C.

MICHIGAN: State board examinations for architects, civil engineers and surveyors—University of Michigan, Michigan State College, University of Detroit and Michigan College of Mining and Technology, Dec. 27-29.



MEMORIAL BRIDGE SPANNING SAVANNAH RIVER COMPLETED

THE JAMES U. JACKSON Memorial Bridge, spanning the Savannah River between Augusta, Ga., and North Augusta, S. C., has been opened to traffic. The main portion of the bridge is made up of two continuous units, each unit consisting of a 125-ft. span flanked by 100-ft. spans. A 30-ft. roadway and a 6-ft. sidewalk are provided.

Richmond County, Ga., and Aiken County, S. C., are owners of the structure, which was built with federal aid at a cost of $200,000. Plans for the bridge were prepared by the Georgia State Highway Department under the direction of C. N. Crocker, bridge engineer. W. B. Brantley, state highway engineer in direct charge, was assisted by E. C. Gartner, division engineer, and N. S. Hardison, resident engineer.

S. F. Scott & Co., Thomasville, Ga., was the general contractor and the Bethlehem Steel Co., Bethlehem, Pa., fabricated and erected the steel. R. P. Cook was superintendent for Scott and D. W. Griffith was superintendent for the steel company.

Road Research Shows High Activity

Highway Research Board meeting discusses subjects ranging from subgrades to traffic speeds and signs

Few aspects of highway design escaped authoritative attention at the 19th annual convention of the Highway Research Board in Washington, D. C., last week. Now divided into seven departments—finance, economics, design, materials and construction, maintenance, traffic, soil investigations—the board devoted Tuesday and Wednesday to department committee reports and discussions and Thursday and Friday to a formal program of papers and department reports.

Top influential body in the highway field, the board, whose membership is made up of official research representatives of federal bureaus, colleges, state highway departments and the like, announced through Roy W. Crum, director, plans for setting up an associate membership available to individuals at $3 per year. Crum also told of a short lecture course in highway economics, scheduled for the week of Jan. 8 at Ames, Iowa, and sponsored by Iowa State College and the Public Roads Administration, which will be repeated in other regions under local sponsorship if the first attempt proves successful. The board's first highway research project census, put out in mimeograph form last summer, is being revised and will be available in printed form this winter.

Stabilization increases

Among the matters that received special attention were stabilized-earth subgrades and surfaces, highway economics, and design of the road from the standpoint of safety. Structural problems of high-type pavements were less prominent than usual.

Data on recent soil stabilization experience, methods and costs were contributed from various states and for different materials—calcium chloride, salt, bituminous cutbacks and emulsions, cements, and lignin. Increasing numbers of test sections are being built; road-mix, plant-mix and traveling mixer construction are used. A survey by W. H. Mills (So. Carolina) showed that on state highways soil-aggregate stabilization greatly exceeds the total of other types.

Costs of stabilization

Practice is usually based on extended soil surveys, made by test pits, soil or post-hole augers or larger drills, and in a few cases electric resistivity measurement, according to L. Muir and W. F. Hughes (Utah). Maryland has equipped a trailer on 23-ft. chassis as traveling soil-testing laboratory, to provide quick field data on grading, density, moisture content, plasticity, etc.

Costs of stabilization were reported ranging from $0.17 to $1.38 per square yard for surface or base stabilization according to depth and frequency of treatment. Improvement of tamping tools is needed, said George E. Martin (Barrett Co.), who characterized the sheepsfoot roller as an awkward tool. He also recommended using less than optimum moisture, as many failures were found to be due to too much water.

Fast construction of stabilized roads was reported by R. R. Litehiser (Ohio), an average speed of 827 ft. and a maximum of 2600 ft. per 10-hr. day, and by W. H. Mills (So. Carolina), maximum 4300 ft. in a 16-hr. day, both with traveling mixer.

Frost heaving reduced by salt

Frost heave as well as freezing damage to materials is due to migration of water toward the point of freezing and formation of ice plates, according to A. F. Gill (Ottawa). R. M. Rowat (Toronto) reported reduction of frost damage to roads by use of salt in Canada, and great increase in use of salt for base-course stabilization. He also told of use of salt on railroad track, which eliminated frost heaving in 40 per cent of the cases.

Retaining walls carrying surcharges are likely to have the resultant of earth pressure located in the middle third. This was reported by M. G. Spangler (Iowa State College) from a study of the combined effect of level backfill and superimposed loads.

Joseph Barnett (Public Roads Administration) recommended designing guard rails for a 4000-lb. passenger car or a 20,000-lb. bus moving at 40 to 50 mph, or a 14,000-lb. truck at 32 to 40 mph.

Sections of concrete pavement laid with longitudinal reinforcement to control cracking, in slab lengths of 20 to 1320 ft. and with light to heavy reinforcement, have developed only fine cracking, according to a report by E. C. Sutherland (P.R.A.) and S. W. Benham (Indiana). Bond tests of rusted reinforcing bars by H. J. Gilkey, S. J. Chamberlain and R. W. Beal (Iowa State College) showed little effect from a light layer of loose, powdery red rust, but large reduction of bond when the rusting was deep.

Curing concrete with calcium chloride admixture was found to be as effective as curing with a bituminous cover spray, in trials reported by Bert Myers (Iowa). Fred Burggraf (Calcium Chloride Assn.) described a horizontal jack to measure the strength of surface and base courses; he found the bearing capacity of the material to be about three times the shear strength shown by the jack tests, and rated a shear value of 20 lb. per sq.in. as indicating good stability and bearing power.

J. S. Crandell (Univ. of Illinois) gave four-year results on the Hocking County (Ohio) road tests of bituminous filler for brick pavements, and stated that bond of filler to brick is incompatible with low-exuding qualities, and that bond may be of minor importance.

Road earnings and maintenance

Highway finance and operation, including maintenance, were given a prominent part on the program. Outstanding among the finance and economic matters was the report of the department of finance made by Wilfred Owen, economist of the Highway Research Board. Here is the highway financing picture as reported by Owen: Fuel taxes to remain fairly stable at present rates; registration fees to continue downward for passenger cars but remain at present levels or tend upward for trucks and buses, while the total of fees will constitute a progressively smaller part of highway user contribution; borrowing to be chiefly with public revenue bonds; toll financing to continue as an extra charge for service beyond that provided generally from ordinary user revenues; diversion to continue a serious problem; 12 states rejected anti-diversion amendments in 1939.

From a study of costs and traffic of state highways, H. B. Shaw (No. Carolina State College) found that over the period 1921-1937 these roads earned 6.4 per cent of their cost, after excluding interest and amortization; earnings were taken as the sum of all funds received by the state highway department. The road investment in 1937 was computed at 8.2 billion dollars, an increase of 5.7 billions during the 17 years, and their annual depreciation at 2.6 per cent.

The validity of Professor Shaw's results as a measure of economic value of roads was questioned by several as failing to reflect actual benefits produced and costs incurred. In a separate paper Prof. R. L. Morrison (Univ. of Michigan) argued that full costs incurred as well as value or income sacrificed must be taken into account in evaluating a road project, although tax rates may be based on expenditure accounting only.

Maintenance data from four southern

states, analyzed by H. K. Bishop (P.R.A.), showed that under heavy traffic high-type pavements cost $40 to $64 per mile per year to maintain, intermediate-type road $249, and low-type roads $577. Additional data are now being obtained in New England.

In reporting for the department of maintenance, W. H. Root, Iowa Highway department, outlined a program of research for the coming year which would cover warping of concrete pavement, wear on gravel roads, continuance of the maintenance cost studies based on the standard form of report supplied to all highway departments, developments in maintenance equipment, stabilized bases and crack and joint fillers.

A maintenance matter that is receiving careful attention is that of traffic zone paint, and J. E. Myers, chief chemist, New York Department of Public Works and chairman of the committee on the subject, announced a survey being made of state and city highway departments to determine present paint testing methods. With about one-quarter of the replies in, it is apparent that greatest reliance is placed on laboratory tests to determine such qualities as consistency, drying time, spreading quality, hiding power, color and stability, wear resistance, flexibility of film, and so forth. Discussion brought out the fact that in some cases more satisfactory results are obtained by using a manufactured paint than by attempting to specify a paint.

The report of the department of soils investigation by C. A. Hogentogler of the Public Roads Administration, consisted of a laboratory demonstration of standard equipment for determining optimum soil moisture and shear values. Hogentogler showed charts that had been developed by which the qualities of a given soil may be determined in less than a minute's time. They represent a great advance toward placing soil investigation work on a practical field use basis.

Lighted highways

Highway lighting came in for considerable discussion following the report of the committee on the subject headed by Burton W. Marsh, director, safety and traffic department of the American Automobile Association. Marsh reported on a Public Roads Administration study of a 1-mile section of lighted road at Chagrin Falls, Ohio. The study revealed that night lighting does not cause people to drive faster than they do in the daytime or than they do with no highway lighting. The study also revealed that the average speed under wet and dry conditions on the lighted section was practically the same; however, fewer cars went over 45 miles an hour on the wet pavement than they did on the dry. Arnold Vey, state traffic engineer of New Jersey, cited a great decrease in night accidents, as a result of lighting; for example, on an 8-mile stretch from Woodbridge to Newark, carrying 50,000 vehicles per 24 hours, comparison of an eight months' period before lighting and after lighting revealed that accidents fell from 229 to 125 and fatalities from 10 to 3.

Highway safety

For the committee on rural highway sidewalks, Earl J. Reeder, National Safety Council, reported that a survey still under way reveals that in 23 states there are 1679 miles of rural sidewalk, of which 545 miles are concrete, 580 asphalt, 551 gravel and 4 brick. The sidewalk committee urges with respect to rural sidewalks that they be placed in transition zones between urban and rural areas, near schools, country clubs or airports, that they should be a part of all bridges and underpasses, that they should be as easy to walk on as the road, that they should be continuous where used, and finally that provision be made for their maintenance. It is also important to keep accident records before and after installation of rural sidewalks in order to determine if their construction was justified.

An extensive field study of legibility of highway signs by the Yale Bureau for Street Traffic Research was made for the Pennsylvania Turnpike Commission and reported by T. W. Forbes, the general conclusion being that for a speed of 50 miles an hour the sign should be 400 ft. from the hazard and should utilize 10-in. wide-type letters or 12-in. narrow type letters.

When a four-lane road in New Jersey was changed into a road of two divided roadways by jacking the slabs apart, accidents decreased 40 per cent and fatal accidents 83 per cent (1937-38 figures compared with 1933-34). Arnold H. Vey (New Jersey), who reported this remarkable result, also said that the principal reduction of accidents occurred between intersections, while accidents at intersections showed little change.

Oregon experiments

Extended experiments in Oregon on skid resistance and light-reflecting qualities of different pavement surfaces, to be published shortly in state bulletins, were reported by John Beakey, K. M. Klein, W. J. Brown, G. S. Paxson, and J. G. Everson.

A recommendation for marking no-passing zones was made by H. E. Neal (Ohio), whose committee favors a yellow auxiliary line on the right side of a white or black center line. The same marking should be used at intersections and railroad crossings, and on short distances of three-lane roads.

Active discussion developed at the committee meeting on roadside development as to the best procedure in using zoning to prevent encroachment of commercial activities on highways. The subcommittee on zoning supported general county zoning, with highways as only one feature and described a successful application in Wisconsin. The general feeling, however, was that this method is too slow and that an immediate start can be made on zoning a strip of land along major highways.

A number of the papers and reports will be abstracted in more detail in next week's issue.

BROWNVILLE BRIDGE ACROSS MISSOURI RIVER DEDICATED

A NEW TOLL HIGHWAY BRIDGE across the Missouri River at Brownville, Neb., was dedicated this week. The structure is owned by Atchison County, Mo.

Its construction involved a new type of pin (*ENR* Nov. 23, 1939, page 687) and a feature of the superstructure is the 840-ft. continuous truss. Ash-Howard-Needles & Tammen were the engineers. C. F. Lytel Co., Sioux City, Ia. built the foundations and Bethlehem Steel Co. the superstructure.

OBITUARY

WILLIAM C. HAWLEY, vice-president and general superintendent of the Pennsylvania Water Co., died Dec. 10 in Wilkinsburg, Pa. Hawley graduated from Rensselaer Polytechnic Institute in 1886 with a civil engineering degree. From 1896 to 1902 he served as engineer and superintendent of the Water Department of Atlantic City, N. J. He joined the Pennsylvania Company as chief engineer and general superintendent in 1902.

PHILIP G. LANG, JR., 56, bridge engineer for the Baltimore & Ohio R. R. for the past eighteen years, died Dec. 9 at Baltimore. Lang had been in the service of the B. & O. for 32 years, entering the railroad's engineering department in 1907 and two years after graduation from the University of Pennsylvania with the degree of civil engineer. He had been in the bridge department since 1917.

CHARLES B. RANDALL, 64, construction supervisor for the Austin Bridge Co. for 25 years, died Dec. 6 in Dallas, Texas. Randall supervised the work of constructing the Corpus Christi, Texas causeway in 1920 and was employed on the Galveston causeway when he became ill three years ago.

CARLOS SELLERIER, 80, known as the dean of Mexican civil engineers, died Dec. 1 in Mexico City. Following graduation from the Mexican National School of Engineering in 1882, he served as chief of the government's technical petroleum department and of the agrarian civil engineering section.

RAYMOND A. SPENCER, 54, assistant general manager of the Canadian Bridge Co., Ltd., Walkerville, Ont., died recently in Windsor, Ontario.

FREDERICK SHOFF, 82, retired contractor and former utility official, died in Lancaster, Pa., Dec. 2. Shoff in 1896 designed the power dam across the Susquehanna River at York Furnace. He once served as president of the Lancaster & York Furnace Electric Railway Co.

AMOS BOYSEN, 71, engineer in charge of construction of Boysen Dam in the upper part of the Wind River Canyon in Wyoming, died recently in Chicago.

GUY E. MITCHELL, for many years chief of the U. S. Geological Survey's executive division, died Dec. 5 in Washington, D. C. Mitchell had worked with the Geological Survey for 32 years.

WILLIAM S. CLARK, 82, who retired this year as chief engineer of the L. Suzio Construction Co., died recently in New England. Clark was once city engineer at Meriden, Conn.

Other recent deaths include: A. B. MELLIS, 79, who retired four years ago after 45 years as a building contractor, Ottumwa, Iowa; JOHN M. MOUNT, 67, building contractor, Centralia, Ill.; ERICK CARLSON, 50, building contractor, Regina, Sask.; DAVID W. COFFMAN, 63, builder of Chandler, Ariz., Phoenix, Ariz.; HUGH L. WILLIAMS, 64, former builder in Michigan, Tucson, Ariz.; FRANCISCO VALENZUELA, 59, general contractor, Tucson, Ariz.; WILLIAM H. SHONS, 74, retired building contractor, Freeport, Ill.; SCOLLY L. GREENLEAF, 88, construction engineer for over 50 years on the Illinois, Ohio and Mississippi Rivers, Quincy, Ill.

CONTRACTS AND CAPITAL

ENGINEERING construction awards for the week total $40,158,000, a decrease of 30 per cent from a week ago, and 33 per cent below the volume for the corresponding week in 1938.

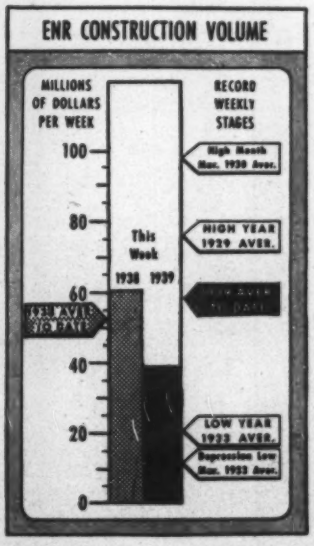
The current week's total brings 1939 construction to $2,190,426,000, an increase of 10 per cent over the volume for the 50-week period last year.

Private awards for the week are 67 per cent above a year ago, the 14th consecutive week that they have topped their respective 1938 values. They are, however, 16 per cent below a week ago. Public construction is 54 and 39 per cent lower, respectively, than last year and last week.

In the classified construction groups, industrial buildings, commercial buildings and large-scale private housing, streets and roads, and unclassified construction exceed their volumes of a year ago; and commercial building and earthwork and drainage top their totals of a week ago.

New capital for construction purposes for the week totals $7,984,000. This compares with $73,104,000 in the corresponding 1938 week. During the week last year, however, $114,954,000 was taken out of *ENR* new capital due to revisions in PWA allotments, and resulted in a deduction of $41,850,000 from the cumulative total. The current week's financing is made up of $4,616,000 in corporate security issues, $3,312,000 in state and municipal bonds, and $56,000 in RFC loans for public improvements.

New construction financing for the year to date, $2,388,011,000, is 34 per cent lower than in the 50-week period last year.



CONTRACTS

(Thousands of dollars)

	Week Ending Dec. 15 1938	Dec. 7 1939	Dec. 14 1939
Federal	$7,171	$4,557	$3,689
State & Municipal	42,664	32,532	19,101
Total public	$49,835	$37,089	$22,790
Total private	10,373	20,650	17,368
TOTALS	$60,208	$57,739	$40,158
Cumulative 1939 (50 weeks)			$2,910,426
1938 (50 weeks)			$2,645,824

Note: Minimum size projects included are: Waterworks and waterways projects, $15,000; other public works, $25,000; industrial building, $40,000; other buildings, $150,000.

NEW PRODUCTIVE CAPITAL

	Cumulative 1938 50 Wk.	1939 50 Wk.
NON-FEDERAL	$2,486,471†	$1,259,983
Corp. securities	372,848	213,203
State & Mun.	719,252	543,419
R.E.A. loans	76,106	89,445
R.F.C. loans	101,844	8,105
P.W.A. allot.	723,265†	.....
U.S.H.A. loans	291,656	215,811
Fed. Aid—Hwys.	201,500	190,000
FEDERAL	$1,143,695	$1,128,028
TOTAL CAPITAL	$3,630,166†	$2,388,011

† Adjusted for revisions in PWA allotments.

FHA MORTGAGES

	Week Ending Dec. 10 1938	Dec. 2 1939	Dec. 9 1939
Selected for appraisal	$19,818	$19,064	$13,324*
Cumulative 1939 (49 weeks)			$1,079,041
1938 (50 weeks)			$ 968,152

* Subject to revision.

ENR INDEX NUMBERS

Index Base		1913	1926
Construction Cost	Dec.	238.17	114.49
Building Cost	Dec.	201.21	108.77
Volume	Nov.	219	96

CONTRACT UNIT PRICES

What contractors are bidding on different kinds of construction work

BRIDGE AND APPROACHES GEORGIA

OWNER: Georgia State Highway Board, Atlanta, Ga.

PROJECT: Construction of overhead bridge and concrete paved approaches on the Atlanta-Jonesboro Road at Central of Georgia Railroad, in Clayton County. Bridge 350 ft. long, with 40-ft. roadway. Approach roadway 0.425 miles long.

CONDITIONS: Contractor to furnish all material. Highway and rail transportation available. Wage rates are: skilled, 60c. per hr.; semi-skilled, 40c. per hr.; and common, 30c. per hr.

BIDS: Fifteen bids were received at Atlanta, November 3, 1939. They range from the contract low of $90,575 to $118,611.

LOW BIDDERS:

1. John Monaghan, Inc., Pelham, Ga. (contract) $90,575
2. MacDougald Constr. Co., Atlanta, Ga..... 91,250
3. Albert Lyons, Rogersville, Tenn..... 94,656

ROADWAY

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Clear and grub	L. S.	$250.00	$250.00	$200.00
2. Clear and grub	1.5 ac.	50.00	30.00	50.00
3. Unclassified excavation	63,103 c. y.	.17	.17	.17
4. Common excavation	2,500 l. f.	.02	.03	.02
5. Ditch excavation	167 c. y.	.50	.30	.30
6. Overhaul on excav	431,765 sta. y.	.001	.002	.0025
7. 12-in. std. rein. conc. pipe	38 l. f.	1.00	.75*	1.25*
8. 15-in. std. str. rein. conc. pipe	30 l. f.	1.05	1.00*	1.40*
9. 18-in. std. str. rein. conc. pipe	220 l. f.	1.25	1.25*	1.50*
10. 18-in. std. str. rein. conc. pipe	72 l. f.	1.25	1.40*	1.50*
11. 18-in. std. str. rein. conc. pipe	89 l. f.	1.50	1.60*	1.50*
12. Cl. B conc. headwalls	4.74 c. y.	20.00	26.00	20.00
13. Grassing; shoulders, slopes	8,297 s. y.	.02	.02	.02
14. Conc. right-of-way markers	12 ea.	2.50	2.00	2.00
15. Remove guard rail	1,780 l. f.	.10	.10	.10
16. Transplant hedges	4,030 l. f.	.10	.05	.10
17. Remove concrete paving	4,066 s. y.	.25	.40	.30
18. Concrete drop inlets	1 ea.	30.00	40.00	50.00
19. Concrete drop inlets	1 ea.	30.00	50.00	50.00
20. Plain conc. pavement	3,882 s. y.	2.10	2.10	2.10
21. H.E.S. concrete pavement	2,319 s. y.	2.25	2.25	2.25
22. Finish and dress	4,997 s. y.	.02	.03	.02
23. Raised edge curb	2,495 l. f.	.05	.05	.03
24. Rein. conc. approach slab	177.76 s. y.	4.00	4.00	4.00
25. Conc. spillways, type 1, 3 & 4	9 ea.	15.00	15.00	15.00
26. Conc. slope drain	47 l. f.	1.50	.80	1.00
27. 8-in. cor. met. pipe slope drain	260 l. f.	1.00	.70	.60
28. Guard rail, conc. posts, Resiliflex	1,200 l. f.	1.06	1.00†	1.00‡
29. Conc. drop inlet spillways, type B	4 ea.	25.00	25.00	40.00
30. Spec. conc. curb	80 l. f.	1.00	.70	.30
31. Crusher run stone, slag, or gravel, incl. hauling	462 c. y.	3.00	2.90	2.00
32. Maintain and remove detours	L. S.	350.00	250.00	600.00

BRIDGE

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Class A concrete	1,115 c. y.	$19.00	$20.00	$22.00
2. Reinforcing steel bars	148,200 lb.	.045	.045	.04
3. Structural steel	L. S.	24,000.00	24,000.00	24,000.00
4. Treated timber piling, 16#	7,025 l. f.	.60	.60	.90
5. Excavation, No. 1	500 c. y.	3.00	1.50	1.00
6. Excavation, No. 2	225 c. y.	.50	.50	1.00
7. Clear and grub	L. S.	500.00	50.00	20.00
8. Remove existing bridge	L. S.	300.00	500.00	600.00

* Corrugated metal pipe † General guard rail ‡ Flexplate guard rail

FISH SCREEN, IDAHO

OWNER: U. S. Bureau of Fisheries, 2725 Montlake Blvd., Seattle, Wash., O. W. Lindgren, engineer.

PROJECT: Constructing revolving fish screen at the Black Canyon Dam, located near Emmett, Idaho. Involves preparing site; concrete for structures; material and equipment for trash racks, paddle wheels, crane, and electrical facilities; and installation of screens.

CONDITIONS: Direct transportation to dam by either railroad or highway. Contractor to furnish all materials except five screen drums which have been furnished by the Government. Hauling costs included in unit prices. Project must be completed in 90 days, necessitating mid-winter work, with unfavorable weather likely. Wages specified are: skilled, $1.25 per hr.; semi-skilled, 65 to 90c. per hr.; and common, 50c. per hr.

BIDS: Three bids were received November 20, 1939, ranging from the low of $25,215 to $28,753. The high bid was received after the other bids had been opened, too late for consideration.

LOW BIDDERS:

1. Soule & Walters, Elma, Wash. (contract)..... $25,215
2. J. A. Terteling, Boise, Idaho..... 26,758
3. Vernan Bros., Boise, Idaho (not considered).. 28,753

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Common excavation	1,600 c. y.	$1.50	$1.50	$1.00
2. Rock excavation	1,000 c. y.	3.20	1.50	2.00
3. Backfill	450 c. y.	.60	.60	.50
4. Concrete	345 c. y.	28.00	34.00	26.50
5. Reinforcing steel	35,000 lb.	.07	.07	.075
6. Trash racks	16,000 lb.	.11	.125	.15
7. Gantry rail and I-Beam	4,500 lb.	.095	.10	.14
8. Gantry crane	L. S.	940.00	1,087.00	1,550.00
9. Misc. metal parts	7,900 lb.	.125	.14	.20
10. Shafting, chain, etc	L. S.	1,400.00	1,690.00	2,300.00
11. Geared motor	1 ea.	450.00	650.00	1,150.00
12. Electrical connections	L. S.	168.00	200.00	500.00
13. Lumber	3 Mbm	79.00	75.00	150.00
14. Install screens	L. S.	865.00	1,000.00	2,600.00

EARTHWORK, TEXAS

OWNER: U. S. Engineer Office, Denison, Tex. John B. Alexander, Denison, engineer.

PROJECT: Excavation for outlet works and construction of temporary bridge for Denison Dam and Reservoir on Red River, north of Denison, Tex., between Texas and Oklahoma state lines. Completed dam to be approximately 6,000 ft. long, 100 ft. high, and 50-ft. wide.

CONDITIONS: Red River quicksand may increase costs. Railway and highway bridges crossing river have experienced difficulties due to shifting sands. Rail and highway transportation available. Labor rates: skilled, up to $1.60 per hr.; semi-skilled, up to 50c.; and common, up to 35c.

BIDS: Thirteen bids were opened Aug. 18, 1939, ranging from the contract low of $761,450 to $1,195,250. Engineer's estimate $948,595.

LOW BIDDERS:

1. Geo. W. Condon Co., and John Kerns Co., Omaha, Nebr. (contract) $761,450
2. Morrison-Knudsen Co., Inc., Boise, Idaho.... 780,590
3. Forcum-James Co., and H. N. Rodgers & Sons Co., Memphis, Tenn..... 838,908

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Excavation	3,000,000 c. y.	$0.136	$0.2375	$0.20
2. Dispose excav. matl., Area 1	450,000 c. y.	.11	.....	.06
3. Dispose excav. matl., Area 2	300,000 c. y.	.09	.....	.04
4. Dispose excav. matl., Area 3	530,000 c. y.	.11	.....	.06
5. Dispose excav. matl., Area 4	340,000 c. y.	.11	.....	.06
6. Dispose excav. matl., Area 5	1,315,000 c. y.	.09	.....	.05
7. Dispose excav. matl., Area 6	65,000 c. y.	.08	.....	.04
8. Foundation cleanup	9,400 sq.	3.00	4.00	5.00
9. Piling	11,320 l. f.	.70	.75	.65
10. Temp. bridge superstr	L. S.	20,076.00	22,000.00	25,000.00